

REMARKS

Favorable reconsideration of this application, as amended, is respectfully requested.

First of all, with regard to the matter raised in the Office communication, the following general, non-limiting explanation regarding the subject matter of Claims 143-168 is provided to assist the Examiner.

The apparatus shown in Fig. 1 of the drawings of patent No. 5,477,304 and the present reissue application is an exposure apparatus in which an illumination optical system 22 illuminates a portion of a pattern on a reticle (original) 7 that is projected onto a substrate 14 by a projection optical system 13. The reticle and the substrate are scanned synchronously along the X-axis (scanning direction) by Xthedrives 24 and 31 that drive the stages 21 and 28, respectively. Deviation of one of the stages relative to the other in a predetermined direction (Y-direction or rotational direction) other than the direction of scanning movement is measured by laser interferometers such as the laser interferometers 35 and 47B which cooperate with movable mirrors 33 and 45, respectively and laser interferometers 36B and 47A which cooperate with movable mirrors 34B and 45, respectively. Deviation measurements are made during the scan, and the stages are adjusted by the fine adjustment drive 25 and the drive 31 on the basis of the measurements by the laser interferometers.

The pattern on the reticle 7 is projected onto the substrate 14 in a reduced scale so that the reduced-scale pattern is printed in different zones of the substrate. The reticle and substrate stages comprise air bearings (air guides) for guiding movement of the stages. Each stage comprises a frame member (base) which supports the stage. A temperature-controlled medium is circulated with respect to the stages (for cooling).

Support for Claims 144-168 in the disclosure of the present application is shown in the following tables:¹

TABLE D

Claim 144	Disclosure
An apparatus according to Claim 143, wherein said adjusting means adjusts movement of the second stage on the basis of measurement by said measuring means	col. 11, line 61 to col. 12, line 18; col. 12, line 60 to col. 13, line 6 and lines 28-37

TABLE E

Claim 145	Disclosure
An apparatus according to Claim 143, wherein said measuring means comprises a laser interferometer	col. 8 lines 39-52; col. 9, lines 1-11

¹ Because of the misalignment of some of the line numbers of the '304 patent with the corresponding lines, as well as the absence of line numbers on some of the columns of the reissue application, a highlighted copy of columns 1-13 of the '304 patent is attached to this Amendment to assist the Examiner.

TABLE F

Claim 146	Disclosure
An apparatus according to Claim 143, wherein said predetermined direction is perpendicular to the direction of scanning movement	col. 8, lines 21-22 and col. 9, lines 49-50

TABLE G

Claim 147	Disclosure
An apparatus according to Claim 143, wherein said predetermined direction is a rotational direction about an axis which is perpendicular to the original or the substrate	col. 5, lines 40-41; col. 8, lines 27-29; col. 9, lines 36-44 and 55-58; col. 11 lines 21-22; and col. 12, lines 4-6

TABLE H

Claim 148	Disclosure
An apparatus according to Claim 143, further comprising means for projecting the pattern of the original onto the substrate in a reduced scale, so that reduced-scale patterns are printed in different zones of the substrate	col. 4, lines 65-67; col. 8, lines 52-54; col. 10, lines 65-66; and col. 11, lines 33-35

TABLE I

Claim 149	Disclosure
An apparatus according to Claim 143, wherein at least one of said first and second stages comprises an air bearing for guiding movement of said stages	col. 8, lines 23 and 55-59 and col. 9, line 13

TABLE J

Claim 150	Disclosure
An exposure apparatus in which a portion of a pattern of an original is projected onto a substrate and in which the original and the substrate are scanned synchronously such that the pattern of the original is transferred to the substrate, said apparatus comprising:	col. 1, lines 9-13; col. 4, line 36 to col. 5, line 29; col. 8, lines 53-55
a stage for scanningly moving one of the original and the substrate in a scanning direction;	col. 8, lines 27 and 58 (stages 21 and 28)
a reference member provided on said stage and being adapted to be used for measurement of the position of said stage; and	col. 8, lines 39-41
detecting means for detecting, with the use of said reference member, deviation of the direction of scanning movement of said stage from a desired direction on the basis of measurement, at different locations along the stage movement direction of the position of the stage with respect to a direction different from the scanning direction	col. 8, lines 41-52; col. 11, line 46 to col. 12, line 7; col. 12, line 60 to col. 13, line 6; and col. 13, lines 28-37

TABLE K

Claim 151	Disclosure
An apparatus according to Claim 150, further comprising means for correcting the direction of scanning movement on the basis of detection by said detecting means	col. 13, lines 28-37

TABLE L

Claim 152	Disclosure
An apparatus according to Claim 150, further comprising a laser interferometer for measuring the position of said stage, wherein said reference member comprises a reference reflection mirror to be used with said laser interferometer	col. 8 lines 39-52; col. 9, lines 1-11

TABLE M

Claim 153	Disclosure
An apparatus according to Claim 150, further comprising means for projecting the pattern of the original onto the substrate in a reduced scale, so that reduced-scale patterns are printed in different zones of the substrate	col. 4, lines 65-67; col. 8, lines 52-54; col. 10, lines 65-66; and col. 11, lines 33-35

TABLE N

Claim 154	Disclosure
An apparatus according to Claim 150, further comprising a frame member which supports said stage and a projection optical system for projecting the pattern of the original onto the substrate	col. 8, lines 24 and 53-56

TABLE O

Claim 155	Disclosure
An apparatus according to Claim 150, wherein said stage comprises an air bearing for guiding movement of said stage	col. 8, lines 23 and 55-59 and col. 9, line 13

TABLE P

Claim 156	Disclosure
An exposure apparatus in which a portion of a pattern of an original is projected onto a substrate and in which the original and the substrate are scanned in a timed relation such that the pattern of the original is transferred to the substrate, said apparatus comprising:	col. 1, lines 9-13; col. 4, line 36 to col. 5, line 29; col. 8, lines 53-55
first and second stages, one of which is for scanningly moving the original and the other of which is for scanning moving the substrate;	col. 8, lines 27 and 58 (stages 21 and 28)
a projection optical system for projecting the pattern of the original onto the substrate;	col. 8, lines 53-55
first measuring means for measuring positional information of said first stage;	col. 8, lines 39-47
second measuring means for measuring positional information of said second stage;	col. 9, lines 1-8
a base for supporting said first stage and for supporting said first measuring means;	col. 8, line 24
a base for supporting said second stage and for supporting said second measuring means; and	col. 8, line 56
means for circulating a temperature-controlled medium with respect to said first stage	col. 9, lines 19-23

TABLE Q

Claim 157	Disclosure
An exposure apparatus in which a portion of a pattern of an original is projected onto a substrate and in which the original and the substrate are scanned synchronously such that the pattern of the original is transferred to the substrate, said apparatus comprising:	col. 1, lines 9-13; col. 4, line 36 to col. 5, line 29; col. 8, lines 53-55
first and second stages, one of which is for scanningly moving the original and the other of which is for scanningly moving the substrate, wherein said first and second stages are guided by air guide means;	col. 4, lines 65-67; col. 8, lines 52-54; col. 10, lines 65-66; col. 11, lines 33-35; col. 8, lines 27 and 58 (stages 21 and 28)
a projection optical system for projecting the pattern of the original onto the substrate;	col. 8, lines 53-55
first measuring means for measuring positional information of said first stage;	col. 8, lines 39-47
second measuring means for measuring positional information of said second stage;	col. 9, lines 1-8
a base for supporting said first stage and said first measuring means; and	col. 8, line 24
a base for supporting said second stage and said second measuring means	col. 8, line 56

TABLE R

Claim 158	Disclosure
An exposure method for the manufacture of microdevices, in which a portion of a pattern of an original is projected onto a substrate and in which the original and the substrate are scanned in a timed relation such that the pattern of the original is transferred to the substrate, said method comprising the steps of:	col. 1, lines 9-13; col. 4, line 36 to col. 5, line 29; col. 8, lines 53-55
providing first and second stages, one of which is for scanningly moving the original and the other of which is for scanningly moving the substrate;	col. 8, lines 27 and 58 (stages 21 and 28)
measuring a deviation of the first stage relative to the second stage with respect to a predetermined direction other than the scanning movement direction; and	col. 8 lines 39-52; col. 9, lines 1-11
adjusting the second stage, on the basis of the measurement in said measuring step	col. 11, line 61 to col. 12, line 18; col. 12, line 60 to col. 13, line 6 and lines 28-37

TABLE S

Claim 159	Disclosure
A method according to Claim 158, wherein said adjusting step comprises adjusting movement of the second stage on the basis of the measurement in said measuring step	col. 11, line 61 to col. 12, line 18; col. 12, line 60 to col. 13, line 6 and lines 28-37

TABLE T

Claim 160	Disclosure
A method according to Claim 158, wherein said measuring step comprises measuring the deviation by use of a laser interferometer	col. 8 lines 39-52; col. 9, lines 1-11

TABLE U

Claim 161	Disclosure
A method according to Claim 158, wherein the predetermined direction is perpendicular to the scanning movement direction	col. 8, lines 21-22 and col. 9, lines 49-50

TABLE V

Claim 162	Disclosure
A method according to Claim 158, wherein the predetermined direction is a rotational direction about an axis that is perpendicular to one of the original and the substrate	col. 5, lines 40-41; col. 8, lines 27-29; col. 9, lines 36-44 and 55-58; col. 11 lines 21-22; and col. 12, lines 4-6

TABLE W

Claim 163	Disclosure
A method according to Claim 158, further comprising projecting the pattern of the original onto the substrate in a reduced scale	col. 4, lines 65-67; col. 8, lines 52-54; col. 10, lines 65-66; and col. 11, lines 33-35

TABLE X

Claim 164	Disclosure
An exposure method for the manufacture of microdevices, in which a portion of a pattern of an original is projected onto a substrate and in which the original and the substrate are scanned in a timed relation such that the pattern of the original is transferred to the substrate, said method comprising the steps of:	col. 1, lines 9-13; col. 4, line 36 to col. 5, line 29; col. 8, lines 53-55
providing a stage for scanningly moving one of the original and the substrate in a scanning direction;	col. 8, lines 27 and 58 (stages 21 and 28)
providing a reference member on the stage, which reference member is adapted to be used for measurement of the position of the stage; and	col. 8, lines 39-41
detecting, by use of the reference member, deviation of the direction of scanning movement of the stage from a desired direction on the basis of measurement, at different locations along the stage movement direction, of the position of the stage with respect to a direction different from the scanning direction	col. 8, lines 41-52; col. 11, line 46 to col. 12, line 7; col. 12, line 60 to col. 13, line 6; and col. 13, lines 28-37

TABLE Y

Claim 165	Disclosure
A method according to Claim 164, further comprising correcting the direction of the scanning movement on the basis of the detection in said detecting step	col. 13, lines 28-37

TABLE Z

Claim 166	Disclosure
A method according to Claim 164, further comprising measuring the position of the stage by use of a laser interferometer, wherein the reference member comprises a reference reflection mirror to be used with the laser interferometer	col. 8 lines 39-52; col. 9, lines 1-11

TABLE AA

Claim 167	Disclosure
A method according to Claim 164, further comprising projecting the pattern of the original onto the substrate in a reduced scale	col. 4, lines 65-67; col. 8, lines 52-54; col. 10, lines 65-66; and col. 11, lines 33-35

TABLE BB

Claim 168	Disclosure
An apparatus for projecting a portion of a pattern of a reticle onto a wafer while scanning the reticle and the wafer so that the pattern of the reticle is transferred to the wafer, said apparatus comprising:	col. 1, lines 9-13; col. 4, line 36 to col. 5, line 29; col. 8, lines 53-55
a reticle stage for scanningly moving the reticle, and being guided by first air guide means;	col. 8, lines 23-30
a wafer stage for scanningly moving the wafer, and being guided by second air guide means;	col. 8, lines 53-59
a projection optical system for projecting the pattern of the reticle onto the wafer in a predetermined reduction scale;	col. 8, lines 52-54 and col. 10, lines 65-66

a first laser interferometer for measuring positional information of said reticle stage;	col. 8, line 42 and col. 9, line 33
a first mirror for use with said first laser interferometer and mounted on said reticle stage;	col. 8, line 39 and col. 9, line 34
a second laser interferometer for measuring positional information of said wafer stage; and	col. 9, line 3
a second mirror for use with said second laser interferometer and mounted on said wafer stage;	col. 9, line 1
wherein said first and second laser interferometers are fixed to bases	col. 8, lines 24 and 57

New Claims 169 and 170 are modifications of Claims 143 and 158, respectively. Support for the new claims is found in TABLE A in the response filed December 7, 1999² and in TABLE R in the present Amendment.

Although Applicant has complied with the requirement in the communication from the Examiner, Applicant respectfully disagrees with the basis alleged for the requirement. 37 C.F.R. § 1.607(a)(5) specifically refers to a claim that Applicant has identified as corresponding to the count. MPEP 2307 does not have the force and effect of either the Patent Statutes or the Rules of Practice (37 C.F.R.) and

² Please correct the following typographical errors: In TABLES A and B, in the second block under "Disclosure" stages 21 and 28 should be referred to. In TABLE C, the Japanese Application referred to in the heading should read --JP 4-289985--.

cannot be properly relied upon to modify what is specifically required by 37 C.F.R. § 1.607(a)(5).

This application now contains Claims 1-170. The status of Claims 1-168 is set forth on page 12 of the Supplemental Amendment filed August 18, 1999 (incorporated herein by reference). As indicated above, Claims 169 and 170 have been added by this Amendment.

A check for \$156.00 is attached in payment of the required fee for excess claims.

The Commissioner is hereby authorized to charge to Deposit Account No. 22-0585 any fees under 37 C.F.R. §§ 1.16 and 1.17 that may be required by this paper and to credit any overpayment to that Account. If any extension of time is required in connection with the filing of this paper and has not been requested separately, such extension is hereby requested.

Respectfully submitted,

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Attachment
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